CLAIMS

What is claimed is:

1. An automated method of producing slices from an embedded sample, comprising:

locating a sample embedded within a support medium;

orienting said embedded sample such that a working surface is presented;

removing a slice of said sample from said embedded sample; and

transferring said slice to a receiving medium.

2. The method of claim 1, wherein said step of locating a sample embedded within a support medium comprises automatically determining an orientation and a depth of said sample within said support medium.

3. The method of claim 2, wherein said determination is achieved by an optical sensor.

4. The method of claim 2, wherein said determination is achieved by a laser.

5. The method of claim 1, wherein said sample is a biological sample.

6. The method of claim 5, wherein said slice that is transferred to a receiving medium is a histologic grade slice.

7. The method of claim 1, wherein said receiving medium is a slide.

8. The method of claim 1, wherein said step of orienting said embedded sample such that a working surface is presented comprises:

maximizing a surface area of said sample that is presented to a cutting surface; and

manipulating said embedded sample to present said maximized working surface to said cutting surface.

9. The method of claim 1, further comprising the step of slicing one or more times to expose said embedded sample prior to said step of removing a slice from said sample from said embedded sample and transferring said slice to a receiving medium.

10. The method of claim 1, further comprising the step of incrementally advancing a continuous blade of a blade assembly from a blade supply canister to a blade take-up canister at predetermined intervals.

11. An apparatus for applying thin sections of a tissue sample to a receiving medium comprising:

blade assembly for slicing thin sections from a tissue sample;

a plurality of transfer rollers sequentially arranged in tangential proximity to each other, such that a thin section on the surface of one transfer roller will be transferred to the surface of the sequentially successive transfer roller;

wherein a first sequential transfer roller of said plurality of transfer rollers is oriented in proximity to said slicing means so that a thin section sliced from said tissue sample will contact the surface of said first sequential transfer roller; and

a receiving medium disposed in tangential proximity to a final sequential transfer roller of said plurality so that a thin section on the surface of said final sequential transfer roller will be transferred to said receiving medium in a substantially smooth and flat configuration.

12. The apparatus of claim 11, wherein at least a portion of a circumference of one or more of said plurality of transfer rollers is covered with a porous material.

13. The apparatus of claim 11, wherein at least a portion of a circumference of

one or more of said plurality of transfer rollers produces attractive and repulsive force on said thin section.

14. The apparatus of claim 11, wherein at least a portion of a circumference of one or more of said plurality of transfer rollers is temperature controlled.

15. The apparatus of claim 11, wherein said slicing means comprises:

a first blade assembly for slicing said tissue sample to expose a working surface; and

a second blade assembly for producing said thin sections.

16. The apparatus of claim 15, wherein one or more of said first and second blade assemblies comprises:

a blade supply canister for providing a continuous blade of a predetermined length; and

a blade take-up canister for receiving said continuous blade;

wherein said continuous blade is advanced from said blade supply canister to said blade take-up canister at predetermined intervals.

17. The apparatus of claim 11, further comprising:

an optical sensor for automatically determining an orientation of said tissue sample.

18. The apparatus of claim 17, further comprising:

a holding assembly for manipulating said tissue sample in response to said orientation determination.

19. The apparatus of claim 11, further comprising a display means for displaying operating information to a technician.

20. A method for applying thin sections of a tissue sample to a receiving medium comprising:

slicing a thin section from a tissue sample, said slicing causing the thin section to peel from the sample and adhere to a first transfer roller;

transferring said thin section from said first transfer roller to an adjacent transfer roller in tangential proximity to said first transfer roller; and

subsequently transferring said thin section from a final transfer roller to a receiving medium in tangential proximity to said final transfer roller;

whereby said thin section is placed on said receiving medium in a substantially smooth and flat configuration.

21. The method of claim 20, wherein said adjacent transfer roller and said final transfer rollers are not the same transfer roller.

22. The method of claim 20, wherein said step of slicing a thin section from a tissue sample comprises:

securing said tissue sample;

determining a location of said tissue sample;

manipulating said tissue sample to a desired orientation;

slicing said tissue sample to a desired depth; and

slicing thin sections of said tissue sample.

23. The method of claim 20, wherein said step of transferring said thin section from a first transfer roller to an adjacent transfer roller in tangential proximity to said first transfer roller comprises:

generating an attractive force on said thin section from said first transfer roller to secure said thin section;

generating a repulsive force on said thin section from said first transfer roller to release said thin section to said adjacent transfer roller; and

generating an attractive force on said thin section from said adjacent transfer roller to secure said thin section.

24. The method of claim 20, wherein said thin section is warmed by one or more of said transfer rollers to assist in forming a substantially smooth and flat configuration for said thin section.

25. The method of claim 20, wherein said step of subsequently transferring said thin section from a final transfer roller to a receiving medium in tangential proximity to said final transfer roller comprises:

generating a repulsive force on said thin section from said second transfer roller to release said thin section to said receiving medium.

26. The method of claim 20, wherein said receiving medium is misted with a medium before said thin section is placed onto said receiving medium.

27. An apparatus for automatically producing tissue slides from a tissue sample within a sample block comprising:

a holding assembly for manipulating said sample block;

a blade assembly for preparing a thin section from said sample block;

a transfer roller mechanism for transferring said thin section to a receiving medium; and

a controller.

28. The apparatus of claim 27, wherein said blade assembly further comprises:

a preliminary blade assembly for removing slices from said sample block to a desired depth prior to the preparation of thin sections.

29. The apparatus of claim 27, wherein said controller tracks said sample block.

30. The apparatus of claim 27, further comprising:

an optical imaging system for locating said tissue sample within said sample block;

wherein said controller determines an optimum orientation of said sample block with respect to said blade assembly.

31. The apparatus of claim 27, wherein said transfer roller mechanism comprises:

a first transfer roller positioned adjacent said blade assembly for receiving said thin section from said blade assembly; and

a second transfer roller for receiving said thin section from said first transfer roller and transferring said thin section to said receiving medium.

32. The apparatus of claim 31, wherein at least a portion of a circumference of one or more of said transfer rollers is covered with a porous material.

33. The apparatus of claim 31, wherein at least a portion of a circumference of one or more of said transfer rollers is temperature controlled.

34. The apparatus of claim 31, wherein at least a portion of a circumference of one or more of said transfer rollers produces attractive and repulsive force on said thin section.

35. The apparatus of claim 27, wherein said blade assembly comprises:

a blade supply canister for providing a continuous blade of a predetermined length; and

a blade take-up canister for receiving said continuous blade;

wherein said continuous blade is advanced from said blade supply canister to said blade take-up canister at predetermined intervals.